



BMP's

## Anticipated Effects of Selected Water Quality On Pesticide Loss

Practice	Relative Effect On Reducing Pesticide Loss		
	By Leaching	In Runoff	With Erosion
Alternative Pesticides	High	High	High
Avoid Saturated Soils	High	Medium	Medium
Band Application	Low	High	Medium
Combining Pesticides	Medium	Medium	Medium
Combined Mechanical and Chemical Control	Medium	Medium	Medium
Contour Farming	Low	Low	Medium
Cover Cropping	Medium	Medium	High
Filter Strips	Low	Low	Medium
Grassed Waterways	Low	Low	Medium
Mechanical Incorporation	Low	High	High
IPM	Medium	Medium	Medium
Irrigation Incorporation	Low	Medium	Medium
Mulch Tillage	Medium	Medium	High
No-till	Medium	Medium	High
Pesticide Combinations	Medium	Medium	Medium
Postemergence Applications	Medium	Medium	Medium
Ridge till	Low	Medium	Medium
Setbacks	Low	Low	Low
Split Applications	Medium	Medium	Medium
Strip Cropping	Low	Medium	Medium
Terraces w/o Outlets	Low	High	High
Terraces with Outlets	Low	Low	Medium

\*Adapted from Nebraska Cooperative Extension Publication, G96-1299-A.

### Practices Explained

Alternative Pesticides	Select pesticides that have a lower potential for loss. Select pesticides with a different mode of action to avoid potential development of resistant pests.
Avoid Saturated Soils	Applying pesticides when the soil is saturated the opportunity for runoff and leaching. Rainfall or irrigation on saturated soil will result in increased runoff, and will sometimes result in leaching as the water with pesticide dissolved or in solution drains through the soil profile. Ground applications during saturated conditions may contribute to soil compactions, resulting in higher runoff.
Band Application	Applying pesticides in a band along or over the top of crop rows reduces the total amount of pesticide applied to the field. One or more cultivation may be necessary to control the weeds between the rows.

Combining Pesticides	Combining different pesticides will reduce the application rate of any one pesticide applied alone.
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Combined Mechanical and Chemical Control	Combining mechanical and chemical controls usually will reduce the overall amount of pesticides used to control weeds.
Contour Farming	Contour farming is the major erosion reduction component of a terrace system, or used alone can reduce erosion and associated transport of pesticides. Furrows, crop rows, and wheel tracks along or nearly on the contour can reduce runoff and erosion. Infiltration is slightly increased.
Cover Cropping	Cover crops reduce runoff and leaching by removing soil moisture, protecting soil from erosion, and building organic matter.
Filter Strips	Grass filter strips along watercourses remove significant amounts of transported sediment that flows through the filter. Grass filter strips are less effective in reducing runoff and leaching. Grass filter strips can reduce runoff by increased infiltration within the strip.
Grassed Waterways	Grassed waterways slow runoff and retain some sediment. Grassed waterways are only slightly effective in reducing pesticides in runoff water. They are most effective during small runoff events. Grassed waterways have little effect on leaching.
Mechanical Incorporation	Mechanical incorporation of pesticides is highly effective in reducing the amount of pesticide in runoff, because it gets the pesticide about 1 inch below the surface of the soil where it will be less likely to be detached. When using mechanical incorporation on erodible land leave sufficient residue to control erosion
IPM	Integrated pest management (IPM) is the application of a variety of practices to control crop pests. Pesticides are used only when pests exceed the economic level that justifies the application. Field scouting is required to monitor and detect pest populations. Non-chemical pest control methods, such as management practices (crop rotation, cultivation, resistant hybrids, altered planting dates) are emphasized practices that can reduce the need for pesticides. IPM may reduce the need for some pesticides, and reduce the amount needed of others.
Irrigation Incorporation	A light application of irrigation water with sprinkler irrigation will incorporate and move the pesticide into the soil surface, however, saturating the soil surface will increase runoff and leaching. Usually, one-half inch of irrigation water will sufficiently incorporate and activate the pesticide. Do not irrigate in the pesticide if the soil surface is near saturation, or rainfall is immanent.
Mulch Tillage	The entire surface of the field is tilled, but tillage equipment is used that maintains some residue on the surface of the field. Time of all tillage operations is critical due to variation in seasonal rainfall duration and intensity. Generally, tillage that incorporates residue reduces infiltration and increases runoff. Properly applied mulch tillage combined with rotation will maintain or improve soil organic matter, increasing water-holding capacity of the soil and reduce pesticide leaching loss.
No-till	With no-till systems soil is undisturbed except for planting and row cultivation, pesticide and fertilizer application. Eventually soil infiltration increases reducing runoff, however, large rainfall events that occur shortly after pesticide application can result in high pesticide runoff. Leaching may be increased slightly due to the retention of water in the soil profile, and the development of a network of larger soil pore from earthworm activity and old root channels.
Postemergence Applications	Pesticide applied postemergence is usually applied at a lower rate, and to drier soil than application made at other times of the year. The postemergence applications are often applied when the potential for high intensity rainfall events that produce runoff, erosion, and leaching is less.
Ridge till	Crops are planted on ridges formed by cultivation during the growing season. Residue is maintained on the soil surface to improve infiltration and reduce runoff. Row cultivation is used to control some weeds, so pesticide applications are normally applied in bands to the row.

Setbacks	A no-spray setback area will reduce the inadvertent loss of pesticide into sensitive areas. Additional benefits are realized if the setback is planted to perennial vegetation. <b>The label on some high loss potential pesticides <u>requires</u> setbacks.</b>
Split Applications	Herbicide runoff is greatest when high intensity rainfall occurs after application, and proportionally greater when high rates of pesticides are used. Split application reduces the amount of pesticide applied at any one time, and allows for flexibility in the timing of the application.
Strip Cropping	Strip cropping alternates crops along the field slope. The runoff from the row crop strips is filtered through the downhill strip of close growing annual crop, or perennial grass strip below. Runoff from the lower strip is reduced, but infiltration may increase.
Terraces w/o Outlets	Terraces without outlets are designed to trap and hold runoff water and allow it to infiltrate into the soil. Solution runoff of pesticides and attached loss of pesticides is reduced, but leaching loss could be increased in the area directly behind the terrace.
Terraces with Outlets	Terraces with outlets are not as effective at reducing attached and solution loss of pesticides, but some reduction in pesticide loss is expected due to the slowing of runoff. The potential also exists for the outlet to transport attached and solution pesticides directly in to sensitive areas.

**\*Adapted from Nebraska Cooperative Extension Publication, G96-1299-A.**

No single BMP is the solution to reducing pesticide loss from agricultural land. A systems approach will be much more effective. Many of the management practices listed above are, for example, sensitive to soil moisture conditions. If conditions are dry they are more effective than if it is wet when the rainfall event occurs. In order to compensate for the varying effectiveness of the BMP's due to soil moisture fluctuation throughout the growing season, a group of complementary practices is much more effective in providing continual control of pesticide loss.

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